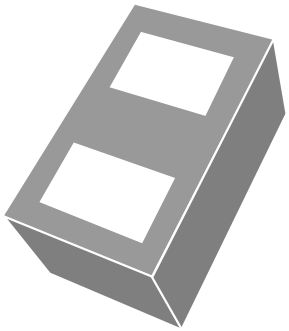
BAT30F4

Small signal Schottky diodes

Datasheet – production data



0201 package

Features

- Very low conduction losses
- Negligible switching losses
- 0201 package
- Low capacitance diode

Description

The BAT30F4 uses 30 V Schottky barrier diodes in 0201 package. This device is intended to be used in smartphones, and is especially suited for rail to rail protection where its low forward voltage drop will help designers to get an efficient protection of their ICs.

Table 1. Device summary

Symbol	Value
V_{RRM}	30 V
T_j (max)	85 °C

Figure 1. Pin configuration and marking

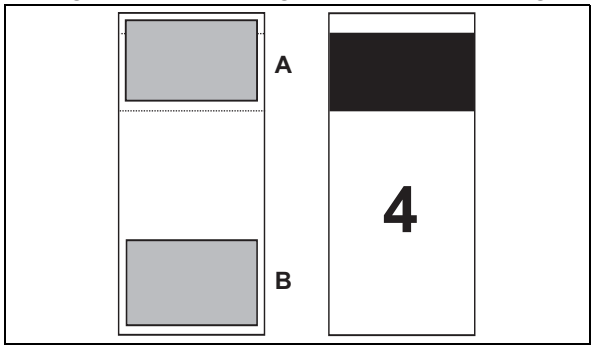
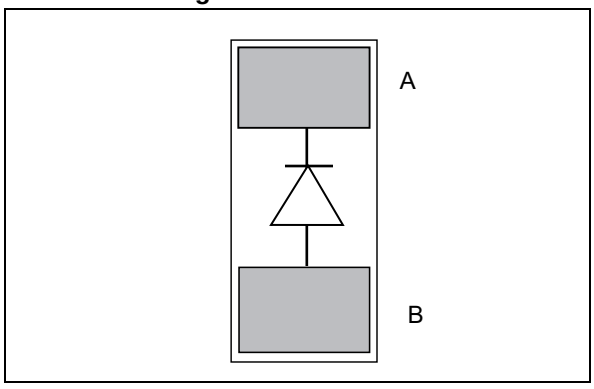


Figure 2. Schematic



1 Characteristics

Table 2. Absolute ratings (limiting values at T_j = 25 °C, unless otherwise specified)

Symbol	Parameter		Value	Unit
V_{RRM}	Repetitive peak reverse voltage		30	V
I_F	Continuous forward current		300	mA
I_{FSM}	Surge non repetitive forward current	t_p = 10 ms sinusoidal	4	A
T_{stg}	Storage temperature range		-55 to +150	°C
T_{op}	Operating junction temperature range		-30 to +85	°C
T_L	Maximum soldering temperature during 10 s		260	°C

Table 3. Static electrical characteristics

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_R (1)	Reverse leakage current	T_j = 25 °C	V_R = 10 V		2.2		µA
		T_j = 85 °C				300	
		T_j = 25 °C	V_R = 30 V			50	
		T_j = 85 °C				1600	
V_F (2)	Forward voltage drop	T_j = 25 °C	I_F = 5 mA			0.285	V
		T_j = 85 °C				0.205	
		T_j = 25 °C	I_F = 10 mA		0.27	0.31	
		T_j = 85 °C				0.24	

1. Pulse test: t_p = 5 ms, δ < 2%
2. Pulse test: t_p = 380 µs, δ < 2%

Figure 3. Reverse leakage current versus reverse applied voltage (typical values)

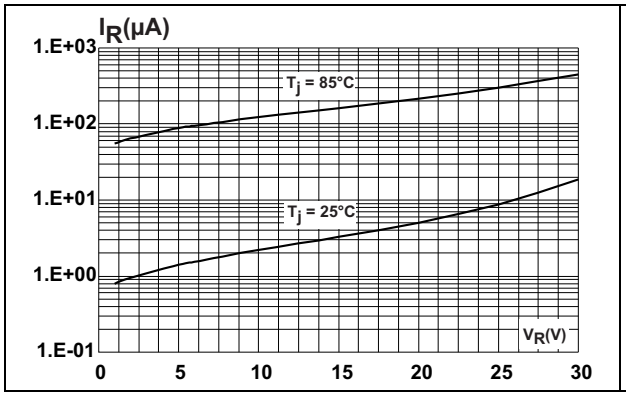


Figure 4. Forward voltage drop versus forward current (typical values)

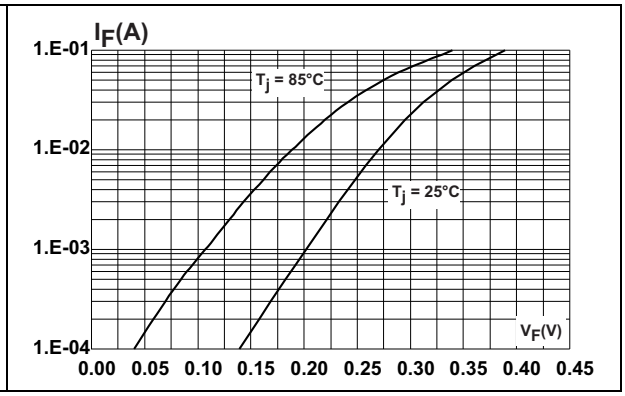


Figure 5. Relative variation of reverse leakage current versus junction temperature

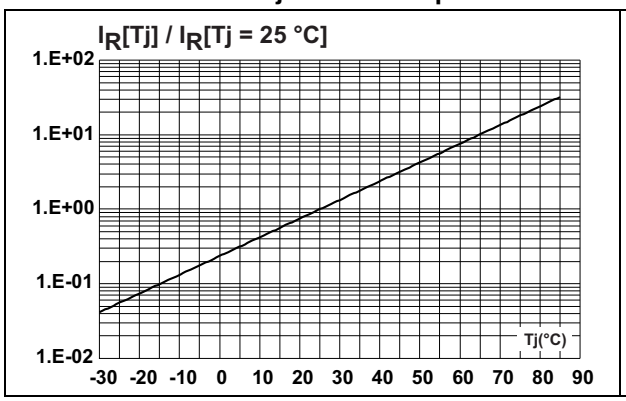
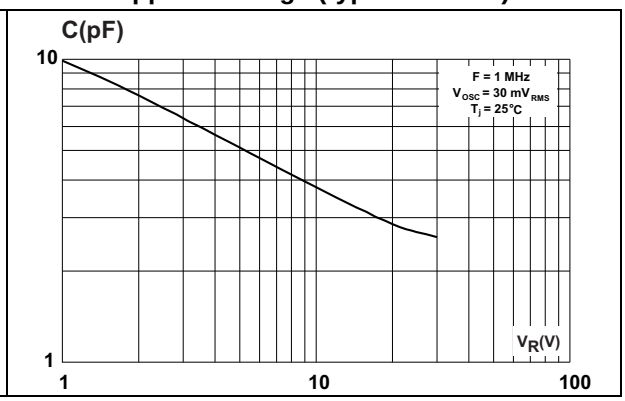


Figure 6. Junction capacitance versus reverse applied voltage (typical values)



2 Package information

- Epoxy meets UL94, V0
- Lead-free package

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com.* ECOPACK® is an ST trademark.

Figure 7. 0201 package dimension definitions

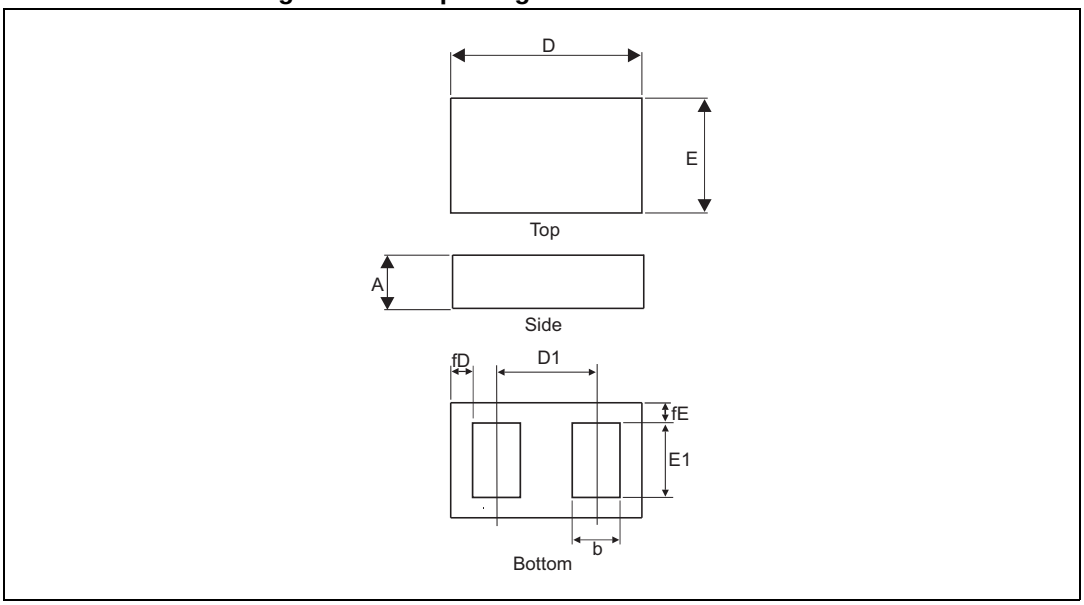


Table 4. 0201 package dimension values

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	0.28	0.3	0.32	0.0110	0.0118	0.0126
b	0.125	0.14	0.155	0.0049	0.0055	0.0061
D	0.57	0.6	0.63	0.0224	0.0236	0.0248
D1		0.35			0.0138	
E	0.27	0.3	0.33	0.0106	0.0118	0.0130
E1	0.175	0.19	0.205	0.0069	0.0075	0.0081
fD	0.065	0.08	0.095	0.0026	0.0031	0.0037
fE	0.11	0.125	0.13	0.0043	0.0049	0.0051

Figure 8. Footprint in mm (inches)

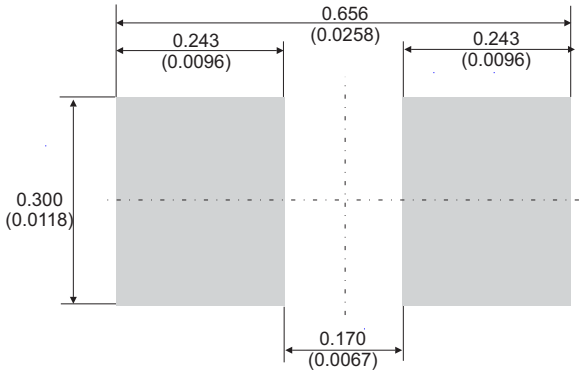
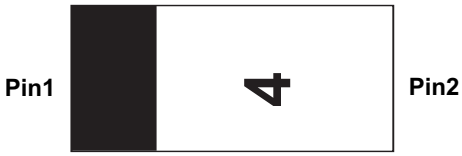
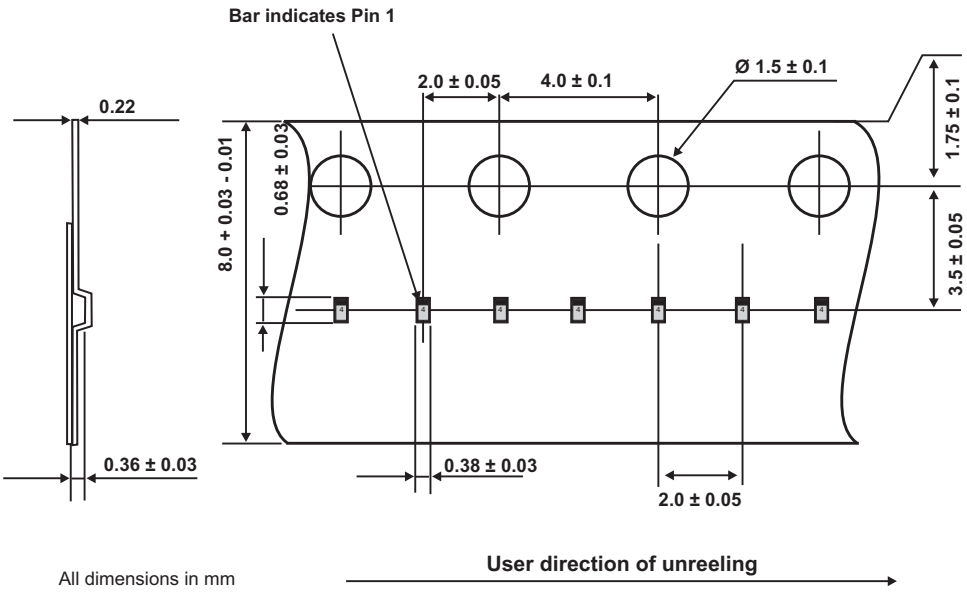


Figure 9. Marking



Note: The marking codes can be rotated by 90° or 180° to differentiate assembly location.In no case should this product marking be used to orient the component for its placement on a PCB. Only pin 1 mark is to be used for this purpose.

Figure 10. Tape and reel specification

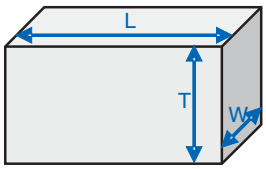


3 Recommendation on PCB assembly

3.1 Stencil opening design

1. General recommendations on stencil opening design
   a) Stencil opening dimensions: L (Length), W (Width), T (Thickness).

Figure 11. Stencil opening dimensions



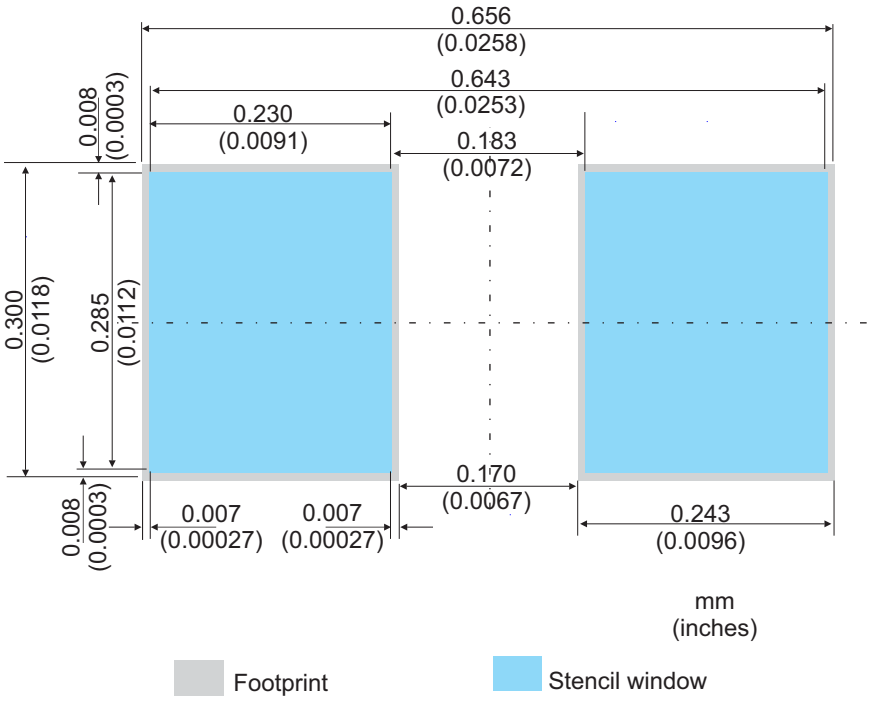
   b) General design rule
   Stencil thickness (T) = 75 ~ 125 µm

$$\text{Aspect Ratio} = \frac{W}{T} \geq 1.5$$

$$\text{Aspect Area} = \frac{L \times W}{2T(L + W)} \geq 0.66$$

2. Recommended stencil window
   a) Stencil opening thickness: 80 µm
   b) Other dimensions: see *Figure 12*

Figure 12. Recommended stencil window position, stencil opening thickness: 80 µm



3.2 Solder paste

1. Use halide-free flux, qualification ROL0 according to ANSI/J-STD-004.
2. “No clean” solder paste recommended.
3. Offers a high tack force to resist component displacement during PCB movement.
4. Use solder paste with fine particles: Type 4 (powder particle size 20-48 µm per IPC J STD-005).

3.3 Placement

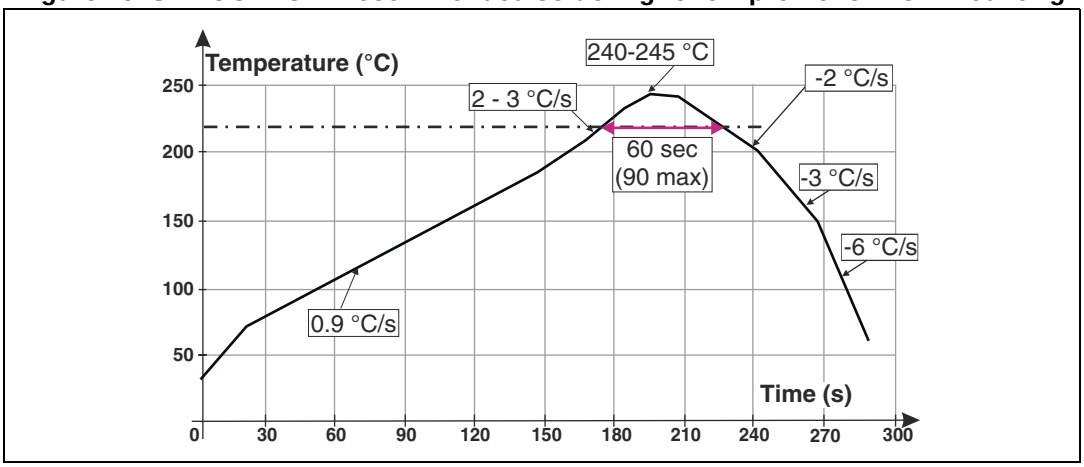
1. Manual positioning is not recommended.
2. It is recommended to use the lead recognition capabilities of the placement system, not the outline centering.
3. Standard tolerance of ± 0.05 mm is recommended.
4. 1.0 N placement force is recommended. Too much placement force can lead to squeezed out solder paste and cause solder joints to short. Too low placement force can lead to insufficient contact between package and solder paste that could cause open solder joints or badly centered packages.
5. To improve the package placement accuracy, a bottom side optical control should be performed with a high resolution tool.
6. For assembly, a perfect supporting of the PCB (all the more on flexible PCB) is recommended during solder paste printing, pick and place and reflow soldering by using optimized tools.

3.4 PCB design preference

1. To control the solder paste amount, the closed via is recommended instead of open vias.
2. The position of tracks and open vias in the solder area should be well balanced. The symmetrical layout is recommended, in case any tilt phenomena caused by asymmetrical solder paste amount due to the solder flow away.

3.5 Reflow profile

Figure 13. ST ECOPACK® recommended soldering reflow profile for PCB mounting



Note: Minimize air convection currents in the reflow oven to avoid component movement.

4 Ordering information

Table 5. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
BAT30F4	4(1)	0201 CSP	0.116 mg	15000	Tape and reel

1. The marking codes can be rotated by 90° or 180° to differentiate assembly location

5 Revision history

Table 6. Document revision history

Date	Revision	Changes
13-May-2014	1	First issue
24-Nov-2014	2	Updated *Table 2*.